ELSEVIER

Blood 142 (2023) 1268–1269

The 65th ASH Annual Meeting Abstracts

POSTER ABSTRACTS

332.THROMBOSIS AND ANTICOAGULATION: CLINICAL AND EPIDEMIOLOGICAL

The Proactive Diagnostic Value of Thrombin-Antithrombin Complex and Antithrombin III in Disseminated Intravascular Coagulation

Qiuyu Guo, MBBS[1], *Fengjiao Han*[1], *Jun Peng*[1], *Ming Hou, MD*[1], *Tichao Shan*[2], *Miao Xu, MDPhD*[3]

[1]Department of Hematology, Qilu Hospital of Shandong University, Jinan, China
[2]Department of Critical Care Medicine, Qilu Hospital of Shandong University, Jinan, China
[3]Department of Hematology, Qilu Hospital of Shandong University, Jinan, China

Introduction Disseminated intravascular coagulation (DIC) is a life-threatening condition with high mortality, necessitating timely and accurate diagnosis for effective management. However, current diagnostic systems can not recognize DIC at its reversible phase, causing suboptimal treatment outcomes. One reason is that most venous thrombosis cases are asymptomatic. Moreover, the focus on abnormalities in coagulation consumption often fails to identify DIC until in a later and irreversible phase. Consequently, the current diagnostic criteria for DIC lacks earlier laboratory indicators. Therefore, our objective was to evaluate the diagnostic potential of selected hemostatic biomarkers (thrombin-antithrombin complex (TAT), soluble thrombomodulin (sTM), tissue plasminogen activator inhibitor complex (tPAI-C), α_2-plasmin inhibitor plasmin complex (PIC) and anti-thrombin III (ATIII)) in assessing DIC before reaching its irreversible phase.

Methods We included 451 patients from intensive care unit who met the following criteria:≥18 years old, non-perinatal period, and a hospitalization length of≥3 days, excluding those with primary hematologic diseases, decompensated liver cirrhosis or chemotherapy history. In total, 101, 57, and 293 patients were diagnosed with overt-DIC (decompensated DIC), pre-DIC (compensated DIC), and non-DIC, respectively. The DIC scores were calculated in accordance with the diagnostic criteria outlined by the International Society on Thrombosis and Haemostasis (ISTH). Day 0 was defined as the day on which hemostatic biomarkers were detected. Global parameters including prothrombin time (PT), fibrinogen (FIB), fibrinogen degradation product (FDP), d-dimer, and platelet count were collected on day 0, 1, 3, 5, and 7.

The spearman correlation analysis was used to analyze the linear relation. Binary logistic regression analysis and receiver operating characteristic curves were used to calculate the area under the receiver operating characteristic curve (AUC). The cutoff value maximizes the sum of the sensitivity and specificity. $P<0.05$ was considered statistically significant.

Results Correlation analysis revealed significant linear correlations between TAT, ATIII, and the global parameters relevant to DIC (pre-DIC and overt-DIC). Specifically, TAT exhibited positive correlation with d-dimer and FDP, while ATIII was correlated with PT, FIB, and platelet count. Of note, TAT/ATIII ratio on day 0 exhibited strong associations not only with fibrinolytic markers but also with coagulation parameters within a week, indicating its potential to be a valuable diagnostic and predictive tool for DIC assessment.

Comparative analysis demonstrated elevated TAT and decreased ATIII levels in DIC group. Remarkably, the TAT/ATIII ratio demonstrated superior diagnostic performance compared to individual biomarkers. Among individual biomarkers, TAT/ATIII ratio had the highest AUC of 0.818 with a cutoff value of 22.1, followed by ATIII (AUC=0.752) and TAT (AUC=0.749). Moreover, when a combination of TAT and ATIII was applied, the AUC increased to 0.847 higher than TAT/ATIII ratio's, improving the diagnostic accuracy for DIC.

TAT and ATIII in pre-DIC group were consistent with those observed in DIC group above: elevated TAT levels, decreased ATIII activity, TAT/ATIII ratio with superior diagnostic performance. Among individual biomarkers, TAT/ATIII ratio had the highest AUC 0.771 with a cutoff value of 22.1 that maximized the sum of sensitivity (55%) and specificity (89%), followed by TAT (AUC=0.73) and ATIII (AUC=0.707). The AUC of TAT combination with ATIII was 0.796, higher than AUC 0.771 of TAT/ATIII ratio, suggesting that TAT and ATIII may also identify the pre-DIC status and predict overt-DIC.

Conclusion This study underscores the remarkable potential of TAT, ATIII, and the TAT/ATIII ratio in predicting DIC with accuracies of 73%, 71%, and 77%, respectively. Moreover, for patients with an ISTH-DIC score of < 5, the presence of following conditions-TAT level ≥10.8 ng/mL, ATIII activity ≤0.58, or TAT/ATIII ratio ≥22.1-indicates a likelihood of developing into irreversible DIC within 7 days. Integrating TAT, ATIII, and the TAT/ATIII ratio into the diagnostic process holds the potential to

expedite clinical interventions during the pre-DIC state and enhance outcomes for DIC patients, further covering the shortage of current ISTH criteria.

Disclosures No relevant conflicts of interest to declare.

https://doi.org/10.1182/blood-2023-178993